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Proceedings of the Newfoundland and Labrador Region Salmonid Stock Assessment Meeting, November 2003.

Compte rendu de l'évaluation des stocks de salmonidés de la région de Terre-Neuve et du Labrador en novembre 2003.

November 5-7, 2003
St. John's, NL

C. C. Mullins

Fisheries and Oceans Canada
Science, Oceans, and Environment Branch
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SUMMARY

The eleventh annual Salmonid Stock Assessment Meeting for the Newfoundland and Labrador Region was held in St. John's, Newfoundland and Labrador, November 5-7, 2003. Overviews and updates were presented of the general status of Newfoundland and Labrador salmon stocks, based on scientific data compiled during 2003 as well as local knowledge and experiences of anglers. The main focus was on a synthesis of trends in adult salmon returns, smolt production and marine survival. Other presentations included and update of rainbow trout investigations, a brief summary of brook trout information on Hughes Brook, salmon in-river distribution inferred from counting facilities and a planning session to discuss salmon marine research. This proceedings report summarizes each of the various presentations and provides an account of the general status of Atlantic salmon stocks in Newfoundland and Labrador in 2003. Detailed summary sheets for the various salmon stocks assessed are appended.

SOMMAIRE

La onzième réunion annuelle d'évaluation des stocks de salmonidés de la Région de Terre-Neuve et du Labrador s'est tenue à St. John's (Terre-Neuve-et-Labrador) du 5 au 7 novembre 2003. On y a présenté des aperçus et mises à jour de l'état des stocks de saumon de Terre-Neuve et du Labrador, fondés sur des données scientifiques recueillies en 2003 ainsi que sur les connaissances locales et l'expérience des pêcheurs sportifs. La réunion a été surtout axée sur une synthèse des tendances des montaisons de saumon adulte, de la production de saumoneaux et de la survie en mer. On y a aussi fait le point sur des études concernant la truite arc-en-ciel et présenté un bref résumé de l'information sur l'omble de fontaine du ruisseau Hughes ainsi que sur la distribution des saumons dans les rivières d'après les recensements effectués aux barrières de dénombrement. Une séance de planification a permis de discuter de la recherche marine sur le saumon. Le présent compte rendu résume chacun des exposés présentés à la réunion et fait état de la situation générale des stocks de saumon atlantique à Terre-Neuve et au Labrador en 2003. Y sont jointes des feuilles récapitulatives détaillées sur les divers stocks de saumon évalués.

INTRODUCTION

The eleventh annual Newfoundland and Labrador Region Salmonid Stock Assessment meeting was held at the Northwest Atlantic Fisheries Centre in St. John's, Newfoundland and Labrador, November 5-7, 2003, to review information on the status of Newfoundland and Labrador Atlantic salmon stocks in 2003. In addition to Department of Fisheries and Oceans (DFO) scientific staff the meeting was also attended by invited participants: DFO Fisheries Management Branch, Parks Canada, Labrador Inuit Association, Gander River Management Association, Salmonid Association of Eastern Newfoundland, Indian Bay Ecosystem Corporation, Provincial Science and Inland Fish and Wildlife divisions, Miawpukek First Nations, Salmonid Council of Newfoundland and Labrador, Atlantic Salmon Federation, Federation of Newfoundland Indians, and the Newfoundland and Labrador Wildlife Federation.

This report contains a synopsis of the status of salmon stocks in Newfoundland and Labrador in 2003 along with summaries of each of the presentations at the November 2003 meeting. Summary sheets for various salmon stocks assessed are appended.

Complete details of the data and methodologies used in the assessments are published in the Department of Fisheries and Oceans Canadian Science Advisory Secretariat Research Document series, while the overall report on the status of stocks is contained in Stock Status Report 2003/048, Newfoundland & Labrador Atlantic Salmon 2003 Stock Status Update which is available at www.dfo-mpo.gc.ca/csas.

A copy of the agenda for the November 2003 meeting is provided in Appendix 1. Participants attending the assessment sessions, in whole or in part are listed in Appendix 2, while working papers and presentations at the meeting are listed in Appendix 3. Individual stock status summary sheets are provided in Appendix 4.

SUMMARY OF SALMON STOCK STATUS

Newfoundland & Labrador

- Compared to 2002 (a below average year), returns of small and large salmon improved for most rivers. However, relative to the average for 1992-2002, many rivers still declined. In view of the closures and restrictions placed on fisheries since 1992, overall salmon abundance continues to be low.

Labrador (SFAs 1-2)

- Based on returns to four counting facilities, stocks appear low considering closure of commercial fisheries.
- Returns of small and large salmon in English River (SFA 1) decreased relative to 2002.
- For SFA 2, returns of small salmon declined in Southwest Brook, stayed the same in Sand Hill River but increased in Muddy Bay Brook compared to 2002. Large salmon declined in Southwest Brook but increased in Muddy Bay Brook and Sand Hill River compared to 2002.

Northeast and eastern Newfoundland (SFAs 3-8)

- In spite of greatly increased spawning in 1992-1996, returns of small salmon decreased overall since 1997, while returns of large salmon increased in three out of six rivers.
- Conservation requirements were achieved in only two (Campbellton and Middle Brook) of six assessed rivers.
- Campbellton River and Middle Brook have met or exceeded conservation requirements in each year of assessment during the commercial salmon fishery moratorium.
- Gander River has met or exceeded conservation requirements in only five of the last twelve years.
- Exploits River, Terra Nova River and Northwest River (Port Blandford) have yet to achieve conservation requirements due to habitat expansion.
- Returns of small salmon to Exploits River were among the highest recorded.
- Northwest River (Port Blandford) had record returns of both small and large salmon in 2003.

Southern Newfoundland (SFAs 9-11)

- Stock abundance overall continues to be lower during the commercial salmon fishery moratorium than prior to the moratorium and there should be no increase in mortality.
- Conservation requirements were achieved in two out of four assessed rivers.
- Northeast Brook (Trepassey) and Rocky River improved compared to 2002 and the 1992-2002 mean while Little River and Conne River did not.

Southwest Newfoundland (SFA 12-13)

- Some improvements in SFA 13 were observed in most of the rivers assessed in 2003 relative to 2002 but population sizes still remain low.
- Conservation requirements were achieved in two out of seven rivers assessed.

Northwest Newfoundland (SFA 14A)

- In spite of greatly increased spawning escapements for Lomond and Torrent rivers in 1992-1996, there has been no corresponding increase in adult (small salmon) recruitment, which should have started in 1997. Western Arm Brook showed an increase over the period.
- Conservation requirements were exceeded in all three assessed rivers in 2003.

Smolt production

- Smolt production in insular Newfoundland declined in four out of five stocks, in comparison with 2002.
- Four of the five rivers experienced peak production in 1997, but since then substantive declines have occurred at Western Arm Brook, Campbellton and Rocky rivers.
- In rivers where smolt production declined in 2003, returns of small salmon in 2004 are expected to be lower unless there is a compensatory increase in marine survival.

Marine survival

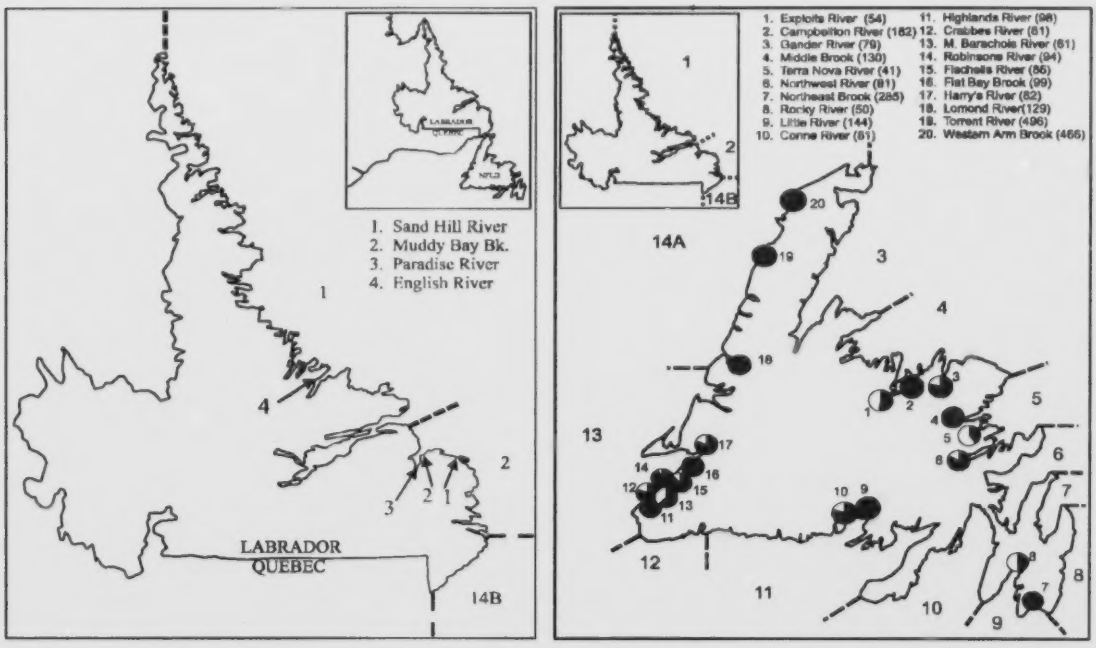
- Marine survival remains highly variable but generally low.
- Higher survivals have occurred in the past, even in years when directed ocean fisheries for salmon were in existence.

OVERVIEW OF PRESENTATIONS

A total of 12 working papers or presentations were made: 8 specific to salmon assessment, monitoring, or enhancement activities; one each on brook trout and rainbow trout; and two related to future research initiatives for DFO Science. One of the two latter presentations included reference to an alternate approach by which two salmon counting facilities on a single river could be used to provide new information on in-river salmon distribution. The other was a planning session for a future meeting to discuss strategic research initiatives such as investigation of at sea mortality of salmon.

Twenty (20) salmon stocks were assessed relative to conservation requirements in insular Newfoundland (plus three sections for Exploits River); four Labrador stocks (English River; Muddy Bay Brook, Paradise River and Sand Hill River) were not assessed relative to conservation. Results for individual rivers are provided in the Summary Sheets (Appendix 4).

The following maps illustrate the Salmon Fishing Areas of the Newfoundland and Labrador Region, the individual rivers assessed and percent of conservation egg requirements (in brackets) achieved in 2003.



SUMMARIES OF INFORMATION PRESENTED

1. Environmental conditions, harvests of salmonids in various fisheries and returns to rivers in Labrador, 2003

Presenter: D. G. Reddin, Department of Fisheries and Oceans

Summary: In 2003, environmental data was collected at several sites in Labrador, angling and food fishery catches were recorded, and returns to four counting fences were enumerated. Water flows in 2003 were average to low in the north while rivers in the south experienced variable flows ranging from below normal to extremely high during several spates. Water temperatures were generally cooler in the north than in the south but temperatures exceeded 18°C. for several periods over the angling season at all sites. Landings in the three food fisheries totalled 18 tonnes in 2002 and preliminary records indicated landings in 2003 were expected to be similar to those of 2002. In Northern Labrador (SFA 1), angling catches increased for both small and large salmon while effort increased substantially and overall catch rates declined compared to those of 2002. In Southern Labrador, landings of small salmon were slightly higher than in 2002 while large salmon landings remained similar to those of 2002. Overall effort declined substantially while catch rate increased slightly over 2002.

A total of 133 small and 19 large salmon returned to English River in 2003. Returns of small were 30% lower than in 2002 while large were 39% lower. For Southwest Brook (Paradise River), a total of 158 small and 16 large salmon returned to the river in 2003. Returns of small were 33% lower than in 2002 while large were 53% lower. For Muddy Bay Brook (Dykes River), a total of 106 small and 11 large salmon returned to the river in 2003. Returns of small salmon were 272% higher than in 2002 while large were 182% higher. For Sand Hill River, a total of 3,157 small and 621 large salmon returned to the mainstem of the river (exclusive of Northwest Tributary) in 2003. Returns of small were similar to those of 2002 while large were 10% higher than in 2002. When landings in the former commercial fishery are taken into account, overall production appears to be lower than prior to the closure of the commercial fishery in 1998.

Comments:

- There continues to be a great deal of concern about the status of salmon stocks in Labrador rivers particularly in Lake Melville where there is high fishing effort in the food fisheries. Elsewhere, food and angling fisheries landings and particularly hook-and-release fishing continue to increase in Labrador. There have also been some changes in Management Plans that take into account increased effort. It is important to note that the food fisheries have moved closer to the communities than was the case during commercial fishing. Hook-and-release fishing is 75% of the angling in Labrador and if mortality rates are higher than the assumed 10% it could impact on spawning escapement. Where angling is frequently from a boat and where rivers descend quickly from higher mountain ranges, it is possible for hook-and-release fishing to result in higher mortality rates than the assumed value of 10%.

- It was expected that angling effort on the Eagle River would increase with the opening of the Trans-Labrador Highway but in fact recorded effort has declined the past two years.
- What criteria are used to determine if Labrador salmon stocks are in difficulty biologically and when/how would it be evident there is a problem? The collection of data needs to be continued for the four index stocks and performance assessed. If there was a decline over a number of years, concern would then be expressed. Only four rivers are monitored out of 100. If we had a small decline in numbers it is uncertain that it would be detected. Large changes would be picked up in the angling catch, food fishery and counting fence information.
- There is concern in northern Labrador over returns to English River. However, this is only one river in a very large area. Only 64 licenses operate in this area. English River also has sea trout and charr stocks that complicate evaluations of salmon production. The benefits of the closure of the fishery in 1998 have not materialized at this point.
- Is there a good relationship between the number of fish in the system and angling catch rates? There are a lot of variables including water conditions, changes in management, fish condition, etc. that affect catch rates. This is why the emphasis is put on the counting fences. Collectively there is some correlation; however, not for any one particular river. The abundance of salmon in the river doesn't equate to the number of fish caught. Exploitation rate changes throughout the fishing season.
- Catch statistics come from camp logbooks for northern Labrador and a mix of license stub return data and camp data in Southern Labrador. However, it is important to note that license stub data from 2003 is not yet available for southern Labrador. Current year estimate for southern Labrador comes from camp data for Eagle and Sand Hill rivers compared to previous years License Stub Return data.
- Any recommendation on the ability to obtain large fish on the Eagle River? No, not based on what we have seen to date. There is concern for the retention of large fish anywhere in Labrador given the high egg deposition potential of large females.
- Angling effort has decreased overall in southern Labrador. The perception is that there would be an increase. What is this decrease attributed to? For southern Labrador it is dominated by Eagle and Sand Hill rivers. Also, some 2003 information is not available.

Recommendations:

1. DFO should continue to support the assessment projects in Labrador at least at current levels.
2. A counting fence project should be started at a river in southern Labrador in 2004.
3. A stock inventory project should be initiated for a river(s) in Lake Melville where stock status remains largely unknown.
4. There should be a project in Labrador rivers to determine hook-and-release mortality rates taking into consideration the use of boats and large size of the rivers.

2. Status of Atlantic Salmon (*Salmo salar* L.) Stocks of Insular Newfoundland, (SFAs 3-14A), 2003

Presenter: M. F. O'Connell, Department of Fisheries and Oceans
Author(s): M. F. O'Connell, J. B. Dempson, C. C. Mullins, D. G. Reddin, C. E. Bourgeois, T. R. Porter, N. M. Cochrane, and D. Caines

Summary: The commercial Atlantic salmon fishery moratorium, implemented in insular Newfoundland in 1992, entered its 12th year in 2003. Returns of small salmon to monitored rivers on the northeast and east coasts in 2003 increased over 2002 (ranging from 12% for Campbellton River to 128% for Northwest River, Port Blandford) for all rivers except Gander River, which remained similar. Exploits River (46%), Terra Nova River (15%), and Northwest River, Port Blandford (128%) increased relative to the 1992-2002 means while Campbellton River (19%), Gander River (25%), and Middle Brook (26%) showed declines. Returns of large salmon in 2003 increased over 2002 for all rivers (24% for Campbellton River - 139% for Northwest Brook, Port Blandford) except Gander River and Middle Brook, which were similar. Compared to the 1992-2002 means, only Exploits River (14%) and Northwest Brook, Port Blandford (121%) showed increases while the remainder had decreases ranging from 13 (Terra Nova River) to 45% (Campbellton River).

In southern Newfoundland, returns of small salmon in 2003 increased over 2002 for Northeast Brook, Trepassey (77%) and Rocky River (46%) but decreased for Little River (34%) and Conne River (24%). With respect to the 1992-2002 means, Northeast Brook, Trepassey (54%) and Rocky River (30%) increased while a decrease occurred for Conne River (34%) and Little River remained similar to the mean. Returns of large salmon increased over 2002 in only Northeast Brook, Trepassey (450%); decreases were noted for Little River (59%) and Conne River (69%). Little River (62%) and Conne River (70%) also declined relative to the 1992-2002 means with Northeast Brook, Trepassey and Rocky River remaining similar.

In Bay St. George (located in SFA 13), returns of small salmon in 2003 increased over 2002 (ranging from 26% for Robinsons River to 159% for Fischells River) for all rivers except Flat Bay Brook, which was similar. Four rivers increased relative to the 1992-2002 means (34% for Fischells River - 84% for Highlands River) while three decreased (Middle Barachois River - 13%) or were similar to the means. Returns of large salmon increased relative to 2002 (48% for Harry's River - 329% for Fischells River) and the 1992-2002 means (17% for Crabbes River - 214% for Harry's River) in four rivers while three showed declines.

On the northwest coast, returns of small salmon to Lomond River and Western Arm Brook in 2003 were similar to those of 2002 while a decrease (18%) was observed for Torrent River. Western Arm Brook showed an increase (38%) relative to the 1992-2002 mean but decreases occurred for Lomond (13%) and Torrent (16%) rivers. Lomond River had an increase in the return of large salmon over 2002 (24%) but remained similar to the mean. Torrent River decreased relative to 2002 (21%) and the 1992-2002 mean (28%) and did Western Arm Brook (52% from both 2002 and the mean)

In summary, compared to 2002 (a below average year), returns of small and large salmon in 2003 improved for most rivers. However, relative to the means for 1992-2002, many rivers still declined. In view of the closures and restrictions placed on fisheries since 1992, overall salmon abundance continues to be low.

Comments:

- Comparison of returns in 2003 with a pre-moratorium mean would be useful. This comparison was not presented in graph form but was shown in Table form, and is routinely included in the research document.
- It was suggested that information be summarized for larger areas rather than river by river. It was pointed out that information has already been compiled in this way to study large scale trends but was not available for presentation at this meeting.
- Experiments on by-catch of salmon following the moratorium suggest that by-catch is small. These and other unknown removals cause uncertainties in calculation of egg deposition.
- Given the low state of many stocks and recent declines there is a need to raise concerns with managers. It is not apparent based on information presented what the level of concern should be. It was pointed out that there is very little ability to forecast.
- There should be some statements or analyses of whether monitored rivers represent trends in adjacent areas. Analyses have been conducted in the past and have shown that northern rivers are significantly correlated with each other while southern rivers are not.
- Returns information available for Little River (SFA 11) may represent minimum values given the presence of salmon below the counting fence.
- For larger river systems such as the Humber, information from smaller indicator rivers such as Hughes brook could be used to assess the stock.
- Low water levels and high temperatures experienced in recent years may have an effect on in-river survival and on future returns, e.g., did low water levels in 1987 result in decreased survival?
- DFO should actively follow up on information received from local anglers particularly in areas where there are no monitored and in areas where there are conservation concerns. Local knowledge is important. Garia Bay in SFA 11 is an example.
- Should examine scientific merit in managing rivers based on size.
- South coast rivers – Conne, Northeast Placentia, Rocky - percent conservation achieved varies, marine survival is trending downward and low and the rivers are generally in poor shape. Size of river is not the best indicator of usefulness of data.
- Need to make concise statements on the overall state of stocks as well as recommendations for management.
- Anglers and local residents have reported good signs of salmon in Gander River in 2003. This contrasts with assessments results based on salmon Brook that the stock was down relative to 2002. Even though water levels were low in Gander River in 2003, it is felt by local residents that catch rates were low due to high temperatures and not the lack of fish.

- In SFA 13 concern was expressed for Southwest & Bottom and Humber River. In the case of the former, these have been kept open while others in the area have been closed or had seasons and bag limits reduced. For Humber River, a transfer of angling effort may be occurring due to the fact that it is a Class I river and attracts anglers who want to fill their six tags.

Recommendations: Nil

3. Estimating the number of salmon smolts at Conne River in 2003

Presenter: J. B. Dempson, Department of Fisheries and Oceans

Summary: For the first time in 17 years, the initial part of the Conne River smolt run was unable to be surveyed in 2003. Thus, an attempt was made to infer plausible estimates for the period from May 10 to May 14 when the smolt trapping devices were inoperable. This value would then be added to the estimate obtained from May 15 until the end of the run (~ 50,000 smolts). Comparisons were made between smolt run timing for the complete run as well as run timing for the period that the counting fences were functional in 2003 (from May 15 onward). Based on comparative run timing metrics (5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of the run), four particular years (1988, 2000, 2001, and 2002) were identified as possible candidates from which to extrapolate for the missing days. Mean daily water temperatures were also comparatively examined for similarities between smolt numbers and temperatures. Based on a combination of water temperature information and the sum of the differences in run timing metrics, the 2002 year proved the 'best' one from which to infer smolt numbers during the May 10 – 14 period. This process added approximately 22,000 smolts, and accounted for about 30% of the final estimate of 72,479 smolt for 2003.

Comments: With the exception of a few questions for clarity, the described procedure was accepted without comment.

Recommendations: Nil.

4. Summary of smolt production and marine survival - 2003

Presenter: J. B. Dempson, Department of Fisheries and Oceans

Summary: Information was presented on trends in Atlantic salmon (*Salmo salar*) smolt production and marine survival from five Newfoundland stocks. Smolt production and survival were found to vary among rivers, and among years within rivers. In general, survival remains low with values ranging from a high of 9.4% at Western Arm Brook, to a low of 2.4% at Conne River, the lowest ever recorded. At two south coast rivers (Conne; Northeast Brook Trepassey), survival was about 20% less than the previous year. However, survival increased in Campbellton and Rocky rivers in 2003. Smolt production in 2003 decline in 4 out of 5 monitored stocks by comparison with 2002. Four stocks have had smolt production values in 2003 that were 21 to 59% less that the corresponding average production for the period 1997 to 2002. In rivers where smolt production declined, returns of small salmon in 2004 are expected to be lower unless there is a compensatory increase in marine survival.

Comments: Comments centred upon the continuing phenomenon of what appears to be reasonable smolt production values, despite the downturn in 2003 in some areas, versus the reality that sea survival remains anomalously low. As in previous years, a general discussion ensued as to the lack of directed research on problems associated with continued low marine survival of salmon. It was noted that some evidence suggests problems with marine survival could be occurring in near shore waters, but there was a lack of directed research to address this issue.

Recommendations: Nil.

5. Exploits River smolt production, Grand Falls 2003

Presenter: C. Bourgeois, Department of Fisheries and Oceans

Summary: Smolt counts for 1997-2003, collected at the Grand Falls Power Canal Bypass, were presented. The 1997 data set included estimates of smolt numbers enumerated while the 1998-2003 data sets included daily counts for the period of operation. The data for 1997-2001 were collected by Abitibi Consolidated contract staff while the 2002-2003 data were collected by DFO staff.

During the 2002-2003 timeframe, smolt mark-recapture studies were conducted to estimate population size above the Grand Falls. Petersen population estimates for the area upstream of Grand Falls for 2002-2003 are presented in the table below.

Year	Smolt Estimate	95% C.I.	
		Lower	Upper
2002	165,412	156,499	174,832
2003	230,498	205,647	258,342

These estimates are considered to be minimal as the smolt were not enumerated or marks applied during the entire run. Concern was expressed as to the percentage of the smolt runs that were not monitored and thus accuracy of estimates.

Recommendations: Continue with mark recapture population estimates with increased effort to ensure monitoring of the entire smolt run.

6. Northwest River Atlantic salmon: 2003 Atlantic salmon stock assessment meetings

Presenter: David Cote, Parks Canada, Terra Nova National Park

Summary: The recreational fishery in Northwest River (SFA 5) was closed in 1996 due to salmon returns well below the river's conservation target (1726 small salmon). Despite the absence of a commercial and recreational fishery, returns continued to decline through 2001 when a record low of 153 salmon passed through the counting fence. A decline of this magnitude was not reflected in any of the other monitored rivers in Newfoundland. Concerns regarding the long-term persistence of the population spurred a new management approach for the river that focused on improving salmon survival in the local area. This approach was based upon increasing stewardship through education and public involvement. After holding several community meetings in the local area, a working group (made up of community residents, other stakeholders, Terra Nova National Park of Canada (TNNPC), the Department of Fisheries and Oceans (DFO), and the Provincial government) was established with the objective of providing recommendations that would restore the salmon stock in Northwest River (with the long-term goal of 700 salmon) and build stewardship amongst local residents. Many on the working group felt that illegal fishing was a major contributing factor to the declines. It was thought that community residents did not discourage illegal fishing previously because they believed the river would never re-open as the conservation target was unattainable.

Therefore, two of the recommendations put forth by the working group were to increase awareness of this conservation issue and to allow the possibility of an incentive-based fishery. It was believed that the losses from an incentive-based fishery would be regained through a reduction in illegal fishing. This recreational fishery was conditional upon an in-season return projection exceeding the interim management target of 500 spawners. With this requirement met, a small recreational fishery of up to 50 fish would be permitted. In 2003 this plan was implemented and sufficient returns enabled the fishery to be opened from July 3rd to July 10th. In total, 51 small salmon were taken and 69% of license holders were successful. Returns to Northwest River reached a record high (1,012 small; 273 large; 1,285 total) and the interim management target was exceeded by 732 spawners. Calculated egg deposition for 2003 was 81% of the conservation egg-deposition requirement and 162% of the long-term management goal. Many aspects of stewardship are difficult to quantify, however, the 2003 management approach appeared to be well received by the community. In addition to Northwest River showing the most improved returns in Newfoundland, the incidence of net scarring on fish counted in the trap was lower (11 individuals) than in previous years suggesting that illegal fishing has been reduced.

Comments: The comments from the audience indicated a need to continue with these types of stewardship/management efforts. Although one individual indicated that the public should be cautious about supporting stewardship at all as it is government's mandate to protect salmon, not that of the public. It was also suggested that only barbless hooks be used in the fishery at Northwest River – an area where they are not required by the legislation of Parks Canada.

Recommendations: Based on the improvements observed in salmon returns to Northwest River in 2003, it is recommended that DFO and Terra Nova National Park maintain the current management approach.

7. Status of the Atlantic salmon (*Salmo salar* L.) stock of Harrys River/Pinchgut Brook, Newfoundland, 2003

Presenter: C. Mullins, Department of Fisheries and Oceans
Author(s): C. C. Mullins, D. Caines, L. Fudge

Summary: A salmon counting fence was successfully operated at the mouth of Harry's River from 11 June until 15 August 2003. A total of 2,334 small and 422 large salmon were counted. These counts were 42-48% higher than estimated in 2002. Relative percentages of small (85%) and large (15%) in the counts were similar to those in snorkel survey observations in the main stem in 2001-2003. Spawning escapements were derived from total counts by subtracting estimated retained and released catches based on the average for 22 July to 7 September 1997-2000. The level of spawning estimated in Harry's River in 2003 potentially achieved 82% of the conservation requirement. This was 37% higher than reported in 2002 (60%) and marks the second consecutive year that the stock has improved following two years of sharp declines in 2000 and 2001. Improvements in 2002 and 2003 coincided with the implementation of a salmon stewardship program by local residents.

Pinchgut Brook counting fence operated from 21 June to 22 October 2003. A total of 353 small and 22 large salmon were counted. Small salmon were 40% lower than in 2002 and large were 4% lower. Both were the second or third lowest in ten years in marked contrast with the increases in 2002 compared to 2000 and 2001. After adjustment for estimated angling removals, approximately 15% of all Harry's River salmon entered Pinchgut Brook tributary in 2003. Given that some may have entered after the counting fence was removed, it is considered to be a minimum value.

Uncertainties associated with estimation of spawning escapements and potential egg depositions on Harry's River based on Pinchgut Brook tributary in 1992-2002 were analysed using a probability density function. The results indicated that with the exception of 1995, there was a 70% or greater probability that the conservation requirement in Harry's River was not achieved since 1992. However, the distribution of spawning within the Harry's River system needs to be better understood to reduce any uncertainty.

Increased returns in the last two years indicate a positive outlook for this stock. However, extremely low water levels and high water temperatures in some years and evidence of illegal removals continue to raise concerns.

Comments:

- There continues to be a great deal of concern about the Harry's River stock. Extensive public consultations in 2002 and 2003 indicated that poaching is a severe problem hampering stock recovery.
- Counts at Pinchgut Brook fence in 2003 may have been affected by below normal water levels during the summer and gravel deposited at the mouth by a spring flood on 31 March. This caused some uncertainty with using in-season counts as an indicator of total returns to Harry's River in 2003.

- With exception of sections near the traps, every second conduit was fished at both the Lower Harry's and Pinchgut counting fences in 2003.
- The Lower Harry's fence was removed on 15 August 2003. It is possible that some fish went through after the fence was taken out. A few incidents of this were reported. However, numbers are considered to be minimal.
- Similarities between the Gander River and the Harry's River methodologies were noted.
- Three years of redd surveys indicated that 33%, 35%, and 41% of spawning in Harry's River occurred in Pinchgut tributary.
- 2003 was not a low water year for Harry's River on the whole. The lowest year was 1999.
- Heavy equipment was not used to open up a path to the Pinchgut Brook fence when gravel was built up at the mouth of the river. It was almost impossible for the fish to swim around or over the bar.
- There is poaching on Harry's River. There is a guardian program that could assist, but because of the DFO arrangement, work can only be done during the day-light hours. If this could be changed, then enforcement measures could make a difference. This can be further discussed at the Management Meeting.
- Is there any available information on angling retention? Angling data will not be processed until March 2004. Before making any decision on Harry's River it is important that this information be obtained. The escapement information did account for the number retained. It was however, only an estimate.
- Does the angling mortality make much difference to the percentage? No not really.
- The number of net marks is high and concern was expressed for the high numbers in Pinchgut Brook. The value for 2003 is close to the highest number of net marks in the time series. The percentage of net marks was lower at the Lower Harry's River fence than at Pinchgut Brook. This suggests that most of the netting is occurring in the river, more specifically in the region of the mouth.
- If proceeding with the counting fence again next year, the Federation of Newfoundland Indians may be in a position to assist earlier in the year rather than later.
- Given that approximately 1,956 salmon can be accounted for among snorkel surveys, angling, other known removals and counts at the Pinchgut Brook fence, it can be estimated that less than 800 salmon were poached as of mid-August.

Recommendations:

1. DFO should continue to support the stewardship initiative on Harry's River and implement management options that will maximise the spawning population.
2. The counting fence at the mouth of Harry's River should be operated for another two years to better understand the distribution of salmon within the Harry's River system and decrease any uncertainty with using the proportion of returns to Pinchgut Brook tributary to estimate total returns to the river in the future.

8. Up-date of Atlantic Salmon Stock Assessments for Five Rivers in Bay St. George Crabbes R., Middle Barachois Bk., Robinsons R. Fischells Bk., Flat Bay Bk., 2003

Presenter: R. Porter, Department of Fisheries and Oceans
Author(s): T. Rex Porter, G. Clarke, and J. Murray

Summary: Salmon were visually counted on five (5) Bay St. George Rivers by snorkelling surveys between August 5 and August 17, 2003. Survey techniques were conducted similar to previous years. Sixteen snorkellers participated in the surveys. An adjustment factor was applied to each Section of each river to obtain an estimate of the total number of salmon in the rivers at the time of the survey. The adjustment factors ranged from 1.0 to 1.25. Water levels were generally low and visibility was usually greater than 4 meters.

The total returns to each river (prior to angling fishery) was estimated by adding the average mortality due to angling recorded for the preceding three (3) or five (5) years depending on river. Total returns of small salmon appeared to have increased in all five rivers in 2003 over 2002. However, only the returns of small salmon in Crabbes River and Fischells Brook were above average. Flat Bay Brook had the highest total returns of small salmon with 1,641 fish. The estimated total returns of large salmon increased only in Crabbes River and Fischells Brook in 2003 compared to 2002. Total returns to both of these rivers were above average in 2003. Crabbes River had the highest returns of large salmon with 264 fish. Increases in egg deposition occurred in all rivers except Middle Barachois Brook, compared to 2002. The egg depositions in Robinsons River and Flat Bay Brook were at 94% and 99% respectively of their Conservation Levels, in 2003. The greatest increases (29% and 41% respectively) were observed in Crabbes River and Fischells Brook.

There is insufficient information to forecast the returns to either river in 2004. The returns in 2004 will primarily be the progeny of salmon that spawned in 1999, a year in which there appeared to have been an increase in egg deposition. Thus, if natural mortality remains the same or increases there may be an increase in returns of small salmon in 2004.

Concerns have been raised about the low spawning stock for more than two decades. The low returns of large salmon are particularly concerning, since many of these fish are virgin 2-sea-winter salmon. Poaching is still believed to be a serious problem hampering the recovery of these stocks.

Comments:

- Increases are consistent with counting fence information on Highlands and Harry's rivers in that they also increased in 2003.
- Fishing mortality is all fish that die as a result of fishing activity and include hook-and- release mortalities as well as other sources such as poaching.
- There was concern that some anglers apparently hook and release more salmon than their legal limit and this may have a negative effect on the populations

- Genetics of large salmon that are 2SW in age are important to the stock overall. On early-run rivers some of the about 27% of the 2SW salmon are less than 63 cm in fork length, which means that some 2SW salmon are being retained because they are less than the current limit of 63 cm. Possibly, the regulation for maximum size limit should be lowered. The representative from the Newfoundland and Labrador Wildlife Federation does support lowering the retention limit from 63 cm.
- There was the suggestion that information on the location of pools containing salmon be made available to enforcement personnel.
- Some salmon may enter the rivers later than the snorkelling survey and thus not included in the population estimates. The proportion entering the river late is unknown and but believed to be less than 10% in most years; however, the proportion is probably variable. It is not practical to postpone the surveys until late September because of the high risk of having to cancel the surveys due to high water levels and reduced visibility.

Recommendations:

1. There should be no increase in fishing mortality on either river.
2. A concerted effort should be made to reduce mortality due to poaching of salmon in all rivers with particular emphasis on Middle Barachois Brook, Fischells Brook, and Crabbes River.
3. The biological characteristic information for all Bay St. George Rivers should be reviewed to determine the proportion of the large that fall in the < 63 cm category.

9. Rainbow Trout Investigations – Update

Presenter: R. Porter, Department of Fisheries and Oceans
Investigators: K. Clarke, C. Mullins, R. Porter, and G. Veinott

Summary: A small on-going research program was initiated several years ago to document the invasion of non-indigenous Rainbow trout (*Onchorhynus mykiss*) into rivers on the west and south coasts of Newfoundland. The investigations currently consist of four components: 1) documentation of distribution, 2) determination of origin, 3) interactions of juvenile rainbow trout with Atlantic salmon and brook trout, and 4) feasibility of using electro-fishing to eliminate rainbow trout from Feeder Brook, Trout River. The database of confirmed observations of rainbow trout by anglers and DFO staff has been updated. The distribution map is provided in Figure 1 below. There was a general increase in distribution of rainbow trout in the mid to late 1990's, although there has been a reduction in the number of reported sightings in 2002 and 2003. This may be related to the fact that rainbow trout are more frequently caught by anglers and they have chosen not to report their catch. Reports have been received almost annually, in recent years, from Trout River, River of Ponds, Lower Humber River, and Flat Bay Brook. Successful reproduction has been documented in Trout River (3 to 5 year classes). It appears that the rainbow trout originated from aquaculture sites in Bay d'Espoir and Maritimes. The exact origin is difficult to determine. Presently, trace elemental analyses are being conducted on otoliths and scales of captured rainbow trout. Reference salmonid parr samples and water chemistry have been taken from Trout River, Lomond River, and River of Ponds. Four elements, Strontium, Barium, Manganese, and Magnesium were regularly detected. Fish from Trout River can be separated from Lomond River and River of Ponds based on Strontium levels; and, fish from Lomond can be separated from River of Ponds based on levels of Manganese and Magnesium. The next step is to conduct analysis on rainbow trout otolith samples. Research on interactions of rainbow trout with Atlantic salmon and brook trout is being conducted on Feeder Brook, tributary of Trout River. Seven habitat sites were defined for routine sampling and habitat utilization in July 2003. The habitat of individual fish was described in each study site, and then the rainbow trout were removed by electro-fishing. The same sites were again sampled in October 2003. There were 16 rainbow trout removed in July and 106 removed in October (all <25 cm). The increase in numbers of rainbow in October appears to be due an upstream migration from Trout River or Trout River estuary. There also appears to be a greater distribution of rainbow trout upstream in Feeder Brook in October than in July. The length frequency distribution indicates that at least three year-classes were present. It is unlikely that rainbow trout can be eradicated by electro-fishing unless spawning distribution is restricted to a small area and can be defined. Neither the spawning time nor spawning distribution has been defined.

Comments:

- One representative indicated that a number of years ago a rainbow trout was angled in Jonathans Pond, Gander River and won a fishing derby for the largest fish. It was reported that someone from Fisheries and Oceans confirmed the fish

identification. However, there was unsubstantiated speculation that the fish may have been captured elsewhere.

- One rainbow was caught at the fish counting fence on Hughes brook in 2003.
- What is scientific advice with respect to escapees? Are they causing a problem? Industry should use reproductively sterile fish, develop better code of conduct to minimise escapees, and develop better containment measures.

Recommendations: A greater research effort is required to determine the distribution of rainbow trout and interactions with native salmonids.

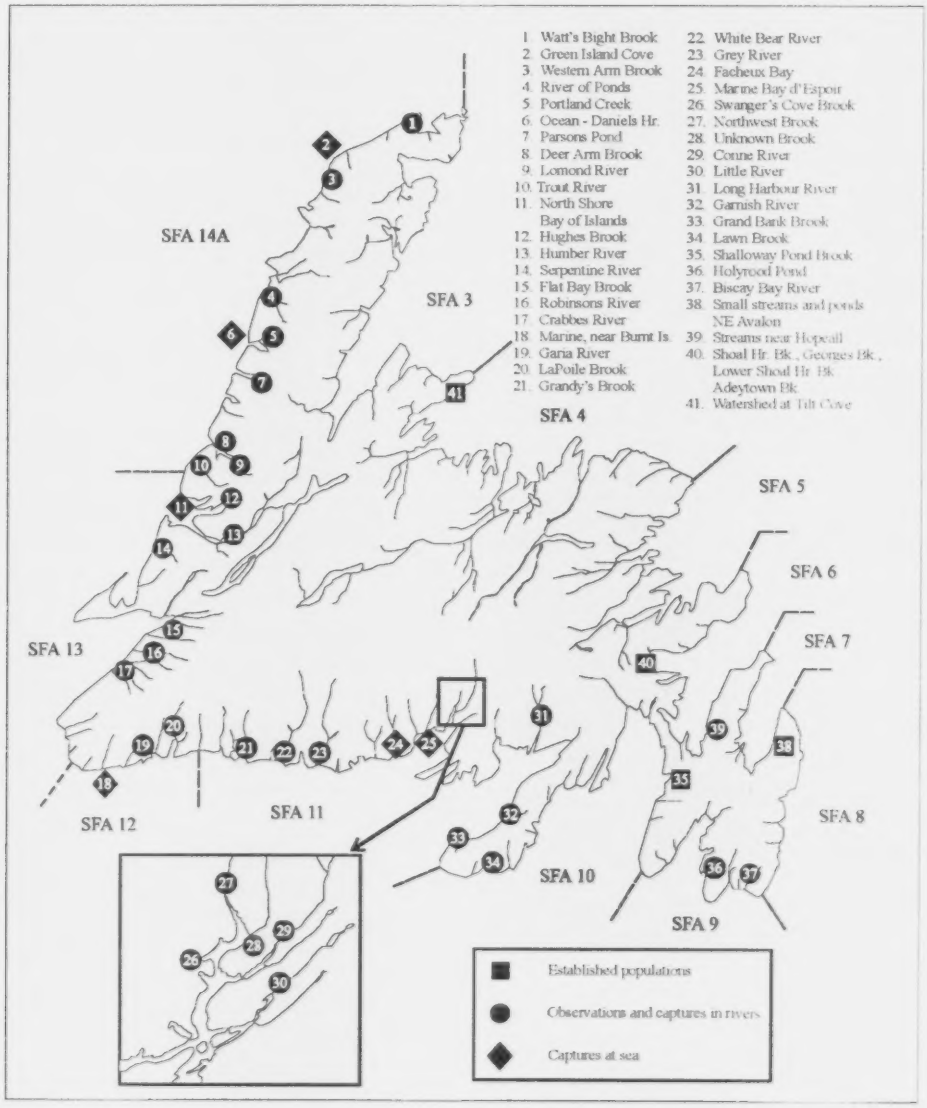


Figure 1 Locations of Rainbow trout sightings in Newfoundland, 1979-2003

10. Salmon Science, Harry's River, NL

Presenter: A. Elkins, Outdoor Rights and Conservation Association

Summary:

- Poaching is occurring within river systems as well as in the marine environment. This may be what is hampering stock recovery in many instances.
- On rivers such as Harry's River, poaching within the river system itself may result in an otherwise healthy run not reaching the spawning grounds. In 2003, anglers and managers may have been overly optimistic about increased returns. A river quota should have been set to safeguard (or improve) our normal ratio of spawning escapement for that river.
- A single counter is not effective on rivers where there was a need to quantify the extent of poaching within the main stem of a river. Two counting facilities such as were established at the mouth of Harry's Rivers and at Pinchgut Brook tributary in 2003 are an example of how two counting facilities can be used to estimate illegal and other removals within a river system.

11. Planning Session for review of salmon research priorities

Discussions lead by: R. Porter, Department of Fisheries and Oceans and L. Felt, Salmonid Council of Newfoundland and Labrador

Summary: An open discussion was held on the above issue in response to concerns raised that the DFO Salmonids Section was not devoting enough research into the causes for the low survival of salmon at sea. Everyone recognized that the resources allocated towards salmon research were inadequate to initiate new research without terminating some current research. There was a general consensus that priority should be given to research in the near-shore environment, including obtaining a better understanding of the salmon food web. There was one view that Science is not properly focussed, in that too much effort is put into aspects that are beyond our control. A representative from the Provincial Department of Tourism, Culture and Recreation suggested that consideration should be given to improving collaboration with the recently established Institute of Biodiversity Science. The Province is particularly interested in research related to resident and sea-run trout. A Steering Group was set up to organize a small workshop to develop approaches to conducting research at sea. The Group consisted of Larry Felt, Don Ivany, Rob Perry, Shane Mahoney, Keith Watts and Rex Porter. The Steering Group had a short meeting and reported back to the Stock Assessment Meeting. The following was decided. A small (maximum 20 people) one-day workshop would be held in the first week of February (Feb 6 or 7) with the objective of recommending a focus for research into determining factors that affect survival of salmon at sea. Outputs from the workshop would be: 1) specific research questions, 2) the scale of research, 3) the order that the research should be conducted, 4) benefits of the research: 5) potential research partners and sources of funds, and 6) identify potential research teams. Several potential workshop participants were discussed. The following material would be presented at the workshop: 1) a summary of research to-date on factors that may affect survival at sea, 2) summaries of previous workshops held to address research on cause of low survival at sea, and 3) a review of proposals submitted for at-sea research. Rex Porter would convene the Steering Group after discussions with DFO staff on the lead-time required to prepare material for the workshop.

Comments: Strong concerns were raised that there are still serious problems inland; therefore, the focus of the salmon research should not change entirely to marine research.

12. Hughes Brook, Newfoundland: Brook trout

Presenter: D. Ivany, Atlantic Salmon Federation

Summary: Counts of salmon and brook trout at the counting fence on Hughes Brook from 1985-2003 were presented. Counts of brook trout were lower in recent years than in some years in the past while counts of salmon were higher in recent years. It was suggested that the data indicates a decline in the population of brook trout that might be addressed through fisheries management.

Comments: This was a good start but it was noted that there is insufficient information on the operation of the counting fence and sea-run versus resident brook trout to conclude whether or not the data reflected a declining trend.

Recommendations: The data should be more fully analyzed and brought forward again. It was also suggested that DFO should collect and analyze the data since this information is available and it is DFO's responsibility to look after salmon and trout stocks.

13. Physical oceanographic conditions on the Newfoundland and Labrador Shelves during 2003

Author: E. Colbourne, Department of Fisheries and Oceans

Note: This summary was not actually presented at the November meeting but is included here because of its relevance to salmon mortality and returns to rivers. In previous years it has formed part of the stock status report for salmon and was included in the draft Newfoundland & Labrador Atlantic Salmon 2003 Stock Status Update that was reviewed by meeting participants.

Marine - Ocean temperatures at Station 27 off St. John's Newfoundland for the first nine months of 2003 indicate above normal conditions during January and February but colder-than-normal conditions during April with values reaching near 0.5°C below average in the upper water column. During May to September, conditions warmed to above normal values. Oceanographic data collected in the offshore areas during the spring on the Newfoundland Shelf generally showed below normal temperatures particularly in the upper part of the water column. Observations from the mid-summer oceanographic survey indicate that the area of the cold-intermediate-layer (CIL <0°C) continued below normal but increased slightly over 2002 values.

Winter and spring of 2003 air temperatures over Newfoundland and Labrador were among the coldest observed in almost a decade. During March air temperatures had dropped to 3.5°C below normal over Labrador (Cartwright) and by 2.5°C below normal over Newfoundland (St. John's). By April, conditions improved somewhat but air temperatures remained near 1.5°C below the long-term average. This resulted in heavy and extensive sea ice on the Newfoundland and Labrador Shelf during the winter and spring of 2003.

Preliminary analyses have shown associations between marine environmental conditions and both marine survival of salmon and adult salmon run timing (Colbourne et al., 2002).

ACKNOWLEDGEMENTS

Thanks are extended to all who participated at the November meeting, particularly those from outside DFO who gave up their own time to attend and contribute to the sessions. Dale Richards kindly assisted with a number of tasks including co-ordinating the meeting, revising portions of the draft SSR and occasionally filling in as chairperson.

Appendix 1

Newfoundland Region
Salmon Stock Assessment 2003 Update Meeting

Date: November 5-7, 2003
Location: E.B. Dunne Boardroom, NWAFC, St. John's, NL
Time: 0900 – 1600 hrs

AGENDA

November 5 (0900-1600)

1.0 0900 - Introduction (Mullins)

2.0 0930 - Data Review:
- 2.01 Harvests of salmonids in various fisheries in Labrador (Reddin)
- 2.02 Returns to Labrador Rivers (Reddin)

1045 – 1100 Break

- 2.03 Returns to Newfoundland Rivers (O'Connell)
- 2.04 Conne River smolt production estimate (Dempson)
- 2.05 Smolt production and marine survival trends (Dempson)

1230 - 1300 Lunch

- 2.06 Exploits River smolt production (Bourgeois)
- 2.07 Northwest River, Port Blandford (Cote)
- 2.08 Harry's River (Mullins)

1445 – 1500 Break

- 2.09 Bay St. George Rivers (Porter)
- 2.10 Rainbow Trout (Porter)
- 2.11 Role for science in salmon stock recovery (Elkins)
- 2.12 Planning session for review of salmon research priorities (Porter)

November 6 (0900-1600)

1. 0900 - Recap
2. 0930 - Review First Draft ***Newfoundland & Labrador Atlantic Salmon 2003 Stock Status Update***

November 7 (0900-1600)

1. Review Second Draft ***Newfoundland & Labrador Atlantic Salmon 2003 Stock Status Update***
2. Other business
   a. Hughes Brook Trout (Ivany)
   b. Marine environmental information

Appendix 2

List of individuals who participated, in whole or in part, at the November 2003 salmonid stock assessment meetings.

NAME	AFFILIATION & ADDRESS	PHONE	FAX	E-MAIL
Bourgeois, C.	DFO Science, St. John's	772-2128	772-3578	bourgeoisc@dfo-mpo.gc.ca
Bouzan, R.	Rural Rights & Boats Owners (NLWF)	364-8415	753-4709	rbouzan.fmc@nf.sympatico.ca
Cooper, G. E.	Nfld-Lab. Wildlife Federation	368-6180		
Cote, D.	Parks Canada, Terra Nova National Park	533-3178	533-2569	david.cote@pc.gc.ca
De Jong, M.	Indain Bay Ecosystem Corporation	737-2302		rjmdejong@nf.sympatico.ca
Dempson, B.	DFO Science, St. John's	772-4475	772-3578	dempsonb@dfo-mpo.gc.ca
Elkins, A.	Outdoor Rights and Conservation Association	437-5975		elkinsa@thezone.net
Felt, L.	Salmonid Council of Newfoundland & Labrador	754-0401	754-9901	lfelt@mun.ca
Francis, C.	Federation of NL Indians	676-2188	676-2187	calvin@fni.nf.ca
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Mullins, C. (Chair)	DFO Science, Corner Brook	637-4352	637-4445	mullinsc@dfo-mpo.gc.ca
Norman, D.	Salmonid Association of Eastern Newfoundland	368-9033		donjoe@roadrunner.nf.net
O'Connell, M.	DFO Science, St. John's	772-2866	772-3578	oconnellm@dfo-mpo.gc.ca
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Reddin, D.	DFO Science, St. John's	772-4484	772-3578	reddind@dfo-mpo.gc.ca
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Slade, B.	DFO Fish Management, St. John's	772-2643	772-3628	sladeb@dfo-mpo.gc.ca
Watts, K.	Labrador Innuit Association	497-8725	497-8751	kwatts@nunatsiavut.com

Appendix 3

List of working papers or other material provided and referenced at the November 2003 assessment meeting

Colbourne, E. B., E. G. Dawe, D.G. Parsons, E. F. Murphy, W. R. Bowring, E. L. Dalley, J. T. Anderson, J. B. Dempson, D. Orr, D. E. Stansbury, and G. P. Ennis. 2002. A preliminary review of environmental-stock relationships for some species of marine organisms in NAFO waters of the Northwest Atlantic. NAFO Scientific Document 02/34. Serial No. N4645. 21 p.

CSAS, 2002. Newfoundland and Labrador Atlantic Salmon Stock Status for 2002. DFO Science Stock Status Report D2-01 (2002), 20p.

ICES, 2003. Report of the Working Group on North Atlantic Salmon. ICES Headquarters, Copenhagen, 1-10 April 2003 ICES CM 2003/ACFM:19.

O'Connell, M. F., 2003. Uncertainty about estimating total returns of Atlantic salmon, *Salmo salar* to Gander River, Newfoundland, Canada, evaluated using a fish counting fence. *Fisheries Management and Ecology* **10**, 23-29.

O'Connell, M. F., J. B. Dempson, C. C. Mullins, D. G. Reddin, C. E. Bourgeois, T. R. Porter, N. M. Cochrane, and D. Caines, 2003. Status of Atlantic salmon (*Salmo salar* L.) stocks of insular Newfoundland (SFAs 3-14A), 2002. DFO Canadian Science Advisory Secretariat Research Document 2003/002.

O'Connell, M. F., J. B. Dempson, C. C. Mullins, D. G. Reddin, C. E. Bourgeois, T. R. Porter, N. M. Cochrane, and D. Caines, 2003. Status of Atlantic salmon (*Salmo salar* L.) stocks of insular Newfoundland (SFAs 3-14A), 2003. DFO Canadian Science Advisory Secretariat Research Document 2003/105.

APPENDIX 4

Summary Sheets

STOCK: Exploits River **Drainage area:** 602 km²

CONSERVATION REQUIREMENT:

Year	1998	1999	2000	2001	2002	2003 *	MIN	MAX
Total returns:								
Small	27093	28802	12063	19370	15486	28,943	4470	29956
Large	1959	2236	684	1347	890	1,331	89	2236
Recreational harvest (small salmon)								
Retained	2843	4407	1467	2430	2166*	1962	577	4407
Released	5672	5154	2899	2967	1517*	2893	1145	5672
Recreational harvest (large salmon)								
Retained	0	0	0	0	0	0	0	83
Released	174	350	252	289	132	124	0	350
Other Removals	45	117	40	59	51	55	0	117
Broodstock removal	0	0	0	0	0	0	0	5111
Spawners	25580	25964	10925	17902	13994	27966	2326	30559
Fry Stocked	0	0	0	0	0	0	0	6416567
Egg conservation requirement								
% met	47	44	21	34	27*	54	6	69
Lower	134	116	56	91	64	156	26	215
Middle	35	35	16	27	23	39	2	43
Upper	6	7	2	5	3	7	0	125

Min and max are for the period of record since 1974

* Preliminary

Data and methodology: There are 35 million m2 units of fluvial habitat and 34,000 ha of lacustrine habitat. Conservation egg requirements are to come from small salmon. Previous fry releases are backcalculated to eggs for % of conservation egg deposition achieved in areas stocked. Total returns to the river are based on the count at Bishop Falls fishway plus angling below the fishway.

State of Stock: Overall returns to the Exploits River, have improved during the moratorium years; however returns to the upper section of the watershed are extremely low and all efforts should be made to increase escapement to this section of the watershed.

Forecast: No quantative forecast available

STOCK: **Campbellton River (SFA 4)** **Drainage area:** 296 km² (accessible)

CONSERVATION REQUIREMENT: 2 916 million eggs (~ 1,480 small salmon) calculated as fluvial area x 2 4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002 [2]	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	1975	3275	3076	1798	2151	1974	2219	1974	4001
Large	321	402	493	208	119	123	152	119	560
Recreational harvest (small salmon)									
Retained	254	375	288	226	148	204	258	23	1547
Released	67	281	126	176	29	68	136	4	281
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	0	63
Released	9	8	22	51	9	2	20	0	51
Precocious post smolts	69	51	83	208	228	253	147	13	253
Spawners									
Small	1645	2821	2692	1345	1772	1510	1800	1645	3675
Large	320	401	491	203	118	123	150	118	557
Egg conservation requirement									
% met	187	311	326	152	148	133	182	133	329
Smolt count	62050	50441	47256	35596	37170	32630	35089	31577	62050
% Sea survival (corrected)									
(Adult return year)	2 25	4 88	5 03	3 66	5 35	5.14	6 02	2 25	7 23

[1] Min and max are for the period of record since 1993.
[2] Preliminary

Recreational Catches: A total of 258 small salmon was retained in 2003 and 136 were released. Angling catches for 2003 are the means for the period 1997-2001

Data and methodology: Smolts were enumerated at a counting fence. Returning adults salmon are enumerated at a fish counting fence with a video camera system. A hook-and -release mortality rate of 10 % was used in the calculations of spawning escapements for the years 1993-03. Recreational data for 1997-02 were from the Licence Stub Return System and are preliminary. Sea survival is corrected to exclude previous spawners in the upstream migration. Pervious spawners were estimated patterns in 1999 from survival patterns in previous years. The egg conservation requirement for years of low sample numbers from the recreational fishery was calculated using the average whole weight of females and percent female by combining samples from 1993 to 2002

State of the stock: Conservation requirements were met from 1993 to 2003

Forecast: No forecast available

STOCK: **Gander River (SFA 4)** **Drainage area:** 6,398 km²

CONSERVATION REQUIREMENT: 46 211 million eggs (21 828 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1996	1997	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to river										
Small	23946	10599	18805	18491	14074	12517	13183	13482	6745	26205
Large	1753	1883	3649	4822	1942	1682	1835	1912	473	4822
Recreational harvest (small salmon)										
Retained	2974	1061	2543	2609	1318	1865	2388	1948	1061	4578
Released	1153	1007	2179	1061	684	756	1430	1268	448	2179
Recreational harvest (large salmon)										
Retained	-	-	-	-	-	-	-		13	927
Released	73	189	298	268	110	180	280	205	39	298
Spawners										
Small	20822	9437	16044	15776	12756	10289	11067	11409	5565	24739
Large	1746	1864	3619	4795	1931	1658	1814	1891	473	4800
Egg conservation requirement										
% met	124	62	110	119	86	81	75	79	36	128

[1] Min and max are for the period of record since 1984 except recreational harvest is since 1994.
[2] Preliminary
Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The number of small salmon retained in 2003 was 1946 and the number released was 1332. Angling catches for 2003 are the means for the period 1997-2001.

Data and methodology: Complete counts of salmon were obtained at a fish counting fence during 1989-99, and have historically been counted at a fishway located on a tributary, Salmon Brook. Returns to the entire Gander River for 2000 - 2003 were estimated from relationships between counts at the Salmon Brook fishway and total returns to the counting fence for the period 1989-1999. Recreational fishery data for 1994-2003 are from the License Stub Return System; data for 2002 and 2003 are preliminary. Data for large salmon for 1997 are incomplete. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2003.

State of the stock: Conservation requirement was not achieved in 2003. Conservation egg requirement was achieved in five of the 12 moratorium years. Conservation requirement in terms of small salmon was met only in 1993. Using Salmon Brook as an indicator of returns to the entire river, it is likely that returns of small salmon of a magnitude similar to or greater than those in 1992-2003 occurred in pre-moratorium years.

Forecast: No forecast available.

STOCK: **Middle Brook (SFA 5)** **Drainage area:** 276 km²

CONSERVATION REQUIREMENT: 2.3 million eggs (~ 1,012 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002 [2]	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	1352	2625	1948	1749	1525	890	1289	626	2625
Large	262	196	130	190	62	69	74	13	262
Recreational harvest (small salmon)									
Retained	163	275	180	112	391	84	224	84	391
Released	54	73	83	25	458	19	139	19	458
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	-	-
Released	9	8	15	23	13	2	14	2	31
Spawners									
Small	1184	2342	1760	1635	1088	804	1051	461	2342
Large	261	195	129	187	61	69	73	13	261
Egg conservation requirement									
% met	193	301	222	217	132	102	130	49	301

[1] Min and max are for the period of record since 1984 except recreational harvest is since 1994.

[2] Preliminary

Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: A total of 224 small salmon was retained in 2003 and 139 were released. Angling catches for 2003 are the means for the period 1997-2001.

Data and methodology: Complete counts are available from a fishway located on the lower river. Recreational fishery data were obtained from the License Stub Return System; data for 2002 and 2003 are preliminary. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2003.

State of the stock: Conservation requirement in terms of eggs and small salmon was met for all years since the moratorium started in 1992 except for small salmon (79%) in 2002. Egg deposition was below conservation requirement for pre-salmon moratorium years 1985-1991. Counts of small salmon similar to or higher than those observed during the moratorium years occurred in pre-salmon moratorium years. The 2003 count of 1105 small salmon is 34% greater than 2002, similar to 2001 and 27% lower than the 1992-1996 and 1997 -2002 means.

Forecast: No forecast available.

STOCK: Terra Nova River (SFA 5) **Drainage area:** 1,883 km²

CONSERVATION REQUIREMENT: 14.3 million eggs (~ 7,094 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002 [2]	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	1732	1868	1892	1707	2261	1437	2322	1127	3050
Large	528	394	344	236	330	272	331	56	637
Recreational harvest (small salmon)									
Retained	389	187	120	146	254	128	219	120	645
Released	221	365	229	464	312	310	318	221	464
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	-	-
Released	13	66	10	71	4	16	33	4	71
Broodstock removal [3]									
Small	352	270	239	132	254	0	0	64	352
Large	29	0	3	5	21	0	0	0	44
Spawners									
Small	1063	1425	1542	1425	1786	1314	2128	815	2620
Large	497	387	340	224	309	270	328	56	588
Egg conservation requirement									
% met	31	33	33	28	36	28	41	14	53

[1] Min and max are for the period of record since 1984 except recreational harvest is since 1994.

[2] Preliminary

[3] In 1994-2001 a number of adults were removed as broodstock for an incubation facility for subsequent fry stocking back to Terra Nova River above Mollyguajeck Falls. these adults were deducted from spawning escapements and the calculation of percent of conservation requirement presented above

Note: Any changes from previous years are due to the updating of preliminary data and biological characteristics information.

Recreational catches: A total of 219 small salmon was retained in 2003 and 318 were released. Angling catches for 2003 are the means for the period 1997-2001.

Data and methodology: Counts are available from a fishway located on the lower river. Returns to the river in 2000 were estimated based on the relationship between counts at the upper fishway and total returns to the the lower fishway for previous years. Recreational fishery data for 1997-2003 are from the License Stub Return System; data for 2002 and 2003 are preliminary. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2003.

State of the stock: The proportion of conservation requirement achieved in 2003 was 41%. Although this river has never achieved conservation requirement, egg depositions during the moratorium years 1992-2003 were generally higher than in pre-moratorium years. It should be noted that accessible rearing habitat for anadromous Atlantic salmon above the lower fishway more than doubled in 1985 with the opening of the area above Mollyguajeck Falls.

Forecast: No forecast available.

STOCK: Northwest River (SFA 5) **Drainage Area:**

CONSERVATION REQUIREMENT: 4.07 million eggs (equivalent to 1,726 small salmon)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total returns:									
Small	498	593	466	540	314	272	102	443	1,012
Large	135	203	182	104	93	106	50	114	273
Recreational Harvest(small salmon)								0	
retained	97	0	0	0	0	0	0	0	51
released	0	7	0	0	0	0	0	0	0
Recreational Harvest(large salmon)									
retained	0	0	0	0	0	0	0	0	0
released	0	0	0	0	0	0	0	0	0
Other removals									
Small	5	1	0	0	1	2	0	1	2
Large	1	8	0	0	1	0	0	1	0
Spawners									
Small	396	592	466	540	313	270	102	442	959
Large	134	195	182	104	92	106	50	113	273
Conservation Requirement									
% eggs met	37	55	46	42	28	27	11	37	81
Smolt Count	-	-	-	-	-	11281	-	-	-
Smolt-to-adult Survival	-	-	-	-	-	1	-	-	-

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information

Data and methodology: Counts of adults have been available from a counting fence since 1995.
A smolt population estimate was conducted in 2000.
Angling data for 2003 provided by Parks Canada.

State of the stock: Conservation egg deposition has not been met during the time series from 1995. A single smolt population estimate resulted in the lowest sea survival recorded on any river studied.

Forecast: No forecast available.

STOCK: Northeast Brook, Trepassey (SFA 9) **Drainage area:** 21 km²

CONSERVATION REQUIREMENT:
fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1996	1997	1998	1999	2000	2001	2002 [2]	2003 [2]	MIN [1]	MAX [1]
Total returns to river										
Small	73	50	91	95	83	56	65	115	49	158
Large	15	9	11	18	14	8	2	11	9	41
Recreational harvest (small salmon)										
Retained										
Released										
Recreational harvest (large salmon)										
Retained										
Released										
Spawners										
Small	73	50	91	95	83	56	65	115	49	158
Large	15	9	11	18	14	8	2	11	9	41
Egg conservation requirement										
% met	196	135	256	248	216	157	156	285	126	368
Smolt count	1749	1829	1727	1419	1740	916	2076	1064	792	1911
% Sea survival										
(Adult return year)	9.2	2.9	5.0	5.5	5.8	3.2	7.1	5.5	2.6	9.2

[1] Min and max are for the period of record since 1984.
[2] Preliminary

Data and methodology: Counts of adults and smolts have been available from a counting fence since 1984 and 1986. Up until a few years ago, this small system was part of a group of experimental rivers involved in research on stock-recruitment relationships and definition of smolt production in terms of various habitat types. The system has become an important indicator of smolt (year i) to (small salmon year i + 1) survival (repeat spawners included).

State of the stock: Conservation egg requirment has been met every year in the time series, but the lowest level achieved occurred in 1992. In terms of small salmon, the lowest percentage of conservation requirement achieved also occurred in 1992. The maximum number of smolts counted was 2,076 in 2002 while the lowest was 792 in 1995. Highest sea survival prior to the commercial salmon-fishing moratorium (8.1%) was recorded in 1987. Lowest survival (2.6%) occurred in 1992. Since the start of the moratorium in 1992, sea survival rose to a peak of 9.2% in 1996 only to plummet to 2.9% in 1997; an improvement over this low was noted for 1998-2000 but dropped again to 3.2% in 2001. Sea survival in 2003 declined from that of 2002 which in trun was one of the highest in recent years.

Forecast: No forecast available.

STOCK: **Rocky River (SFA 9)** **Drainage area:** 296 km²

CONSERVATION REQUIREMENT: 3.4 million eggs (~ 881 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1998	1999	2000	2001	2002	2003	MIN [1]	MAX [1]
Total returns to river								
Small	423	327	277	233	276	402	80	435
Large	130	77	104	60	78	73	1	89
Recreational harvest (small salmon)								
Retained					0	0		
Released					5	5		
Recreational harvest (large salmon)								
Retained					0	0		
Released					0	0		
Broodstock removal	0	0	0	0	0	0	0	76
Spawners								
Small	423	327	277	233	276	401	158	435
Large	130	77	104	60	78	73	1	89
Fry stocked	0	0	0	0	0	0	81983	434500
Egg conservation requirement								
% met	54	39	34	33	40	50	17	56
Smolt count	12163	8625	7616	9392	10144	4440	5115	16900
% Sea survival								
(Adult return year)	1.8	2.9	2.1	3	3	4	1.8	4.2

[1] Min and max are for the period of record since 1987.
[2] Preliminary
smolt to adult survival for 2001 - 2003 is smolt to small salmon

Background: Rocky River was stocked with salmon fry from 1983 to 1987 with the first returns to the reconstructed fishway realized in 1987. Also in 1987 140 adult salmon were transferred into Rocky River from Little Salmonier River.

Data and Methodology: Fluvial habitat consists of 1.08 million m2 and lacustrine habitat includes 2200 ha. Biological characteristics used in calculations are those for Rocky River stock. Previous fry releases are backcalculated to eggs for % of target egg achieved in areas stocked. Complete adult counts are available from a trap installed in the fishway. Smolts have been enumerated annually since 1990. Sea survival is smolt to 1SW salmon returns to the fishway.

Recreational fisheries: 2002 was the first time a recreational fishery (hook and release only) was opened on Rocky River.

State of the stock: Stock is still in the development phase.

Forecast: There is no forecast for this stock.

STOCK: **Conne River (SFA 11)** **Drainage area:** 602 km²

MANAGEMENT TARGET: 7.8 million eggs (~ 4,000 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

CONSERVATION REQUIREMENT: 4.34 million eggs (~ 2,475 small salmon)

Year	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to home waters								
Small	2931	2358	5177	1503	2573	1953	1503	10155
Large	294	241	216	140	167	51	51	516
First Peoples' harvest								
Small	0	0	0	0	0	0	0	948
Large	0	0	0	0	0	0	0	11
Recreational harvest (small salmon)								
Retained	-	-	730	215	275	180	108	3302
Released	-	-	-	-	-	-	0	60
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	0	27
Released	-	-	-	2	-	-	0	0
Broodstock removal								
Small	0	0	0	0	0	0	25	245
Large	0	0	0	0	0	0	0	1
Spawners								
Small	2926	2349	4431	1286	2295	1770	1286	7823
Large	294	240	216	140	167	51	51	488
Management Target								
% met	84	68	117	37	63	45	37	219
Egg conservation requirement	150	122	210	67	113	81	67	394
% met								
Smolt estimate	69841	63658	60777	86898	81806	71479	55765	100983
% Sea survival (Adult return year)	2.9	3.4	8.1	2.5	3.0	2.4	2.4	10.2

[1] Min and max are for the period of record since 1974. First Peoples' harvest in salt water includes some salmon from other rivers. First Peoples' fishery quota of 1200 fish has been in effect since 1986, but was reduced to 500 fish for 1993. First Peoples' fishery and recreational fishery were closed again in 1998 and 1999.
[2] Preliminary

Data and methodology: Smolt estimates are derived from mark-recapture surveys. Returning adult salmon are enumerated at a fish counting fence. Angling harvests for Conne River are from DFO statistics. A video camera system was introduced in 1993.

State of the stock: The Management Target, which is higher than the conservation egg requirement, was met from 1986 to 1990 and again in 1996 and 2000, with 45% achieved in 2003. Sea survival to small salmon decreased from 3.0% to 2.4%, the lowest recorded. In contrast with the Mangement Target, the Conservation egg requirement was met or exceeded from 1986-1990, in 1993, and again from 1995 - 2000, and again in 2002. In 2003, 81% of the conservation requirement was attained.

Forecast: Based upon the point estimate of the number of smolts that migrated in 2003, a marine survival rate of 3.46% would be required in order for the conservation requirement to be attained in 2004, while a survival of 5.60% would be needed to meet the Management Target. Based upon the sea survival rates that have resulted over the past 15 years, and without any consideration of the trend for lower survivals during the past decade, the probability of achieving the above returns are 57% and 35%, for the conservation and management targets, respectively. These probabilities drop to 38% and 27%, respectively, if survival values during the past 10 years only are considered.

STOCK: **Little River (SFA 11)** **Drainage Area:**

CONSERVATION REQUIREMENT: 0.306 million eggs (equivalent to 230 small salmon)

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total returns:	84	135	801	478	313	356	616	161	528	335
Small	73	118	674	399	264	307	564	125	487	322
Large	11	17	127	79	49	49	52	36	41	13
Recreational Harvest(small salmon)	-	-	-	-	-	-	-	-	-	-
retained	-	-	-	-	-	-	-	-	-	-
released	-	-	-	-	-	-	-	-	-	-
Recreational Harvest(large salmon)	-	-	-	-	-	-	-	-	-	-
retained	-	-	-	-	-	-	-	-	-	-
released	-	-	-	-	-	-	-	-	-	-
Other removals	0	5	19	14	9	10	3	0	6	0
Small	0	5	18	13	7	8	3	0	5	0
Large	0	0	1	1	2	2	0	0	1	0
Brood stock removals:	0	85	119	3	168	258	352	0	0	0
Spawners	84	45	663	461	116	88	261	161	522	335
Small	73	33	538	383	N/A	57	N/A	125	482	322
Large	11	12	125	78	N/A	31	N/A	36	40	13
Fry Stocked	118472	0	92528	145921	0	306180	298458	288897	0	0
Conservation Requirement	37	56	288	200	50	38	263	69	224	144
% eggs met										
Smolt Count	501	2712	4449	2521	3320	1177	2703	4983	9963	8570

Note: Any changes from previous reports are due to the updating of preliminary data and biological charactenstics information

Recreational catches: The river is presently closed to angling.

Data and methodology: Returns to the river are assessed by a counting fence.

State of the stock: Returns of salmon are considered to be minimum values as salmon are often observed that do not pass through the counting fence.

Forecast: No forecast available.

STOCK: **Highlands River (SFA 13)** **Drainage area:** 183 km²

CONSERVATION REQUIREMENT: 1.5 million eggs calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to home waters								
Small	96	146	58	75	169	294	58	398
Large	117	82	67	65	87	166	29	166
Recreational harvest (small salmon)								
Retained								
Released								
Recreational harvest (large salmon)								
Retained								
Released								
Spawners								
Small	96	146	58	75	169	294	58	398
Large	117	82	67	65	87	166	29	166
Conservation requirement								
% met	59	49	34	35	53	99	28	105
Smolt count	5922	9634	13120	-	-	-	5922	15839
% Sea survival								
Small	1.4	2.5	0.6	0.6	-	-	0.6	3.2
Large	0.9	1.2	1.1	0.7	0.7	-	0.4	1.4
(Adult return year)								

[1] Min and max are for the period of record since 1974

[2] Preliminary

Data and methodology: Counts of smolt and adult salmon were obtained with a fish counting fence in 1980 - 82 and in 1993 - 2000. Adults salmon only have been enumerated since 2001. Sea survival was calculated for small salmon returning in year i + 1 and for large salmon returning in year i + 2, by dividing the number of returning adults by the number of smolts in year i.

State of the stock: The number of large salmon returning increased coincident with the closure of the commercial salmon fishery in 1992, but fell in each of the next four years following the peak in 1997. Returns of large salmon in 2003 were the hightest on record. Small salmon returns are variable with returns in 2003 the highest since 1997, and the second highest ever recorded. The conservation spawning requirement was achieved only once (1997), but was essentially met (99%) again in 2003.

Forecast: No forecast was made as smolts have not been monitored since 2000.

STOCK: **Crabbes River (SFA 13)** **Drainage area:** 551 km²

CONSERVATION REQUIREMENT: 4.6 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1998	1999	2000	2001	2002	2003	MIN [1]	MAX [1]
Total returns to river								
Small	494	717	1027	688 [3]	630 [2]	1107 [2]	111	1916
Large	239	265	156	180 [3]	136 [2]	264 [2]	15	397
Recreational harvest (small salmon)								
Retained	-	-	-	- -			26	561
Released	121	76	31	46	163 [2]	87 [2]	0	278
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	14	127
Released	51	18	42	42	68 [2]	44 [2]	0	119
Spawners								
Small	482	709	1024	683 [3]	614	1098	64	1355
Large	234	263	152	176 [3]	129	260	15	346
Egg conservation requirement								
% met	53	66	63	53 [3]	43	81	3	95

[1] Min and max are for the period of record since 1974
[2] Preliminary
[3] Minimum

Data and methodology: Visual counts of salmon were made by snorkellers in August, 1996 to 2003. Adjustment factors were applied to the visual counts to give an estimate of the total number of salmon in the river. Angling data are from the License Stub Return System. The 2002 angling data are preliminary; and the 2003 is the mean catch data 1998-2002. A 10% hook-and-release mortality was assumed.

State of the stock: In 2003, at the time of the survey, Crabbes River had attained 81% of its egg deposition conservation level. This estimate is the highest lowest recorded since 1997 when 95 % of the conservation level was attained. It is 29% higher than the average percentage 1996-02. The total returns of small salmon spawners, in 2003, is 39% higher than the average returns 1996-2002, and the number of large salmon is 16% higher than the average returns.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2003. However, given the low spawning escapement in 1998 and 1999 it is unlikely that the conservation requirements will be met.

STOCK: **Middle Barachois Brook (SFA 13)** **Drainage area:** 241 km²

CONSERVATION REQUIREMENT: 2.1 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002	2003	MIN [1]	MAX [1]
Total returns to river									
Small	1056	N/A	562	1142	937 [3]	548 [2]	735 [2]	134	1619
Large	189	N/A	66	155	142 [3]	165 [2]	101 [2]	0	1159
Recreational harvest (small salmon)									
Retained	-	-	-	-	-	20 [2]	-	51	534
Released	123	9	22	3	26	133 [2]	15 [2]	0	195
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	0	117
Released	73	0	2	0	9	49 [2]	3 [2]	0	81
Spawners									
Small	1044	N/A	560	1142	934 [3]	515	733	83	1329
Large	182	N/A	66	155	141 [3]	160	101	0	1057
Egg conservation requirement									
% met	95	N/A	43	95	80 [3]	61	61	9	254

[1] Min and max are for the period of record since 1974
[2] Preliminary
[3] Minimum

Data and methodology: Visual counts of salmon were made by snorkellers in August 1996, 1997, 1999 to 2003. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. Angling data are from the License Stub Return System, 1996-2002. The 2003 angling catch of small salmon in 2003 is assumed to be equivalent to the average catch 1998-2001. A 10% hook and-release mortality was also ssumed.

State of the stock: In 2003, at the time of the survey, Middle Barachois Brook had attained 61% of its egg deposition conservation level. The estimate is the about the same as the egg deposition in 2002, but 14% lower than the average 1996-2002. The returns of small salmon were 13% lower than the average returns 1996-2002, and the returns of large salmon were 20% lower than the average.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2004.

STOCK: **Robinsons River (SFA 13)** **Drainage area:** 439 km²

CONSERVATION REQUIREMENT: 3.3 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	1107	N/A	1452	1501	1909 [3]	998 [2]	1260 [2]	274	3186
Large	195	N/A	204	320	232 [3]	206 [2]	182 [2]	21	733
Recreational harvest (small salmon)									
Retained	5	0	0	153	106	188 [2]	149 [2]	3	905
Released	853	462	529	553	268	523 [2]	448 [2]	0	634
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	0	210
Released	230	105	38	44	134	80 [2]	86 [2]	7	184
Spawners									
Small	1017	N/A	1399	1293	1776 [3]	758	1066	158	2281
Large	172	N/A	200	316	219 [3]	198	173	21	604
Egg conservation requirement									
% met	91	N/A	118	135	142 [3]	82	94	9	174

[1] Min and max are for the period of record since 1974.
[2] Preliminary
[3] Minimum

Data and methodology: Visual counts of salmon were made by snorkellers in August 1996, 1997, 1999 to 2003. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river. Angling data are from the License Stub Return System, 1996-2002. The 2003 angling catch is assumed to be the same as the average catch 1998-2002. A 10% hook-and-release mortality was assumed.

State of the stock: In 2003, at the time of the survey, Robinsons River had attained 94% of its egg deposition conservation level. The estimate is the 15% higher than in 2002, but 11% below average, 1996-2002. The total returns of both small and large salmon to the river increased by 21% from 2002, but remains the second lowest since 1998.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2004.

STOCK: **Fischells Brook (SFA 13)** **Drainage area:** 360 km²

CONSERVATION REQUIREMENT: 3.6 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	863	205	1264	1800	248 [3]	414 [4]	1071 [2]	42	1800
Large	89	72	246	276	45 [3]	42	180	0	455
Recreational harvest (small salmon)									
Retained	240	8	-	-	34	-	-	17	374
Released	242	27	-	-	3	-	-	0	162
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-	-	0	66
Released	159	4	-	-	7	-	-	0	150
Spawners									
Small	599	194	1264	1800	214 [3]	399	1046	25	1800
Large	73	72	246	276	44 [3]	42	180	0	415
Egg conservation requirement									
% met	44	23	110	142	18 [3]	28	86	1	142

[1] Min and max are for the period of record since 1974.
[2] Preliminary
[3] Minimum
[4] Includes 15 salmon removed from poachers net in 2002 and 25 in 2003.

Data and methodology:

Visual counts of salmon were made by snorkellers in August each year 1997 to 2003. Adjustment factors were applied to visual counts to give estimates of the total numbers of salmon in the river at the time of the survey. Angling data are from the License Stub Return System. The River was closed to angling in 1999, 2000, 2002 and 2003. A 10% hook-and-release mortality was assumed. Twent-five salmon were taken from a poachers net.

State of the stock:

In 2003, it is estimated that, at the time of the survey, Fischells Brook had attained 86% of its egg deposition conservation level, which is 41% higher than the average 1997-2002. The total return (1071) of small salmon is a 162% increase from 2002, and is the thrid highest in the 7 -year time series.

Forecast:

There is insufficient information available to forecast the abundance of Atlantic salmon in 2004. However, based on the high spawning stock in 1999, there may be an increase in returns to the river.

STOCK: **Flat Bay Brook (SFA 13)** **Drainage area:** 635 km²

CONSERVATION REQUIREMENT: 3.8 million eggs (spawners not defined) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002	2003 [2]	MIN [1]	MAX [1]
Total returns to river									
Small	1320	N/A	2276	2397	1150 [3]	1560 [2]	1641 [2]	179	2308
Large	174	N/A	235	494	176 [3]	202 [2]	200 [2]	5	477
Recreational harvest (small salmon)									
Retained	.	.	.	146	170	157 [2]	158 [2]	0	609
Released	378	139	389	1165	280	302 [2]	582 [2]	0	1081
Recreational harvest (large salmon)									
Retained	.	.	.	.	.	.	.	0	59
Released	71	60	36	276	34	70 [2]	127 [2]	0	257
Spawners									
Small	1282	N/A	2237	2134	952 [3]	1373	1425	107	2237
Large	167	N/A	231	466	173 [3]	195	187	1	466
Fry stocked	149555	0	0	0	0	0	0	56059	149555
Egg conservation requirement									
% met	89	N/A	149	167	71 [3]	97	99	4	167

[1] Min and max are for the period of record since 1974
[2] Preliminary
[3] Minimum

Data and methodology: Visual counts of salmon were made by snorkellers in August each year 1996 and 1998 to 2003. Adjustment factors were applied to the visual counts to derive an estimate of the number of salmon in the river at the time of the survey. Angling data are from the License Stub Return System. The 2003 angling catch is assumed to be the same as the average catch 1998-2002. A 10% hook-and-release mortality was assumed.

State of the stock: In 2003, at the time of the survey, Flat Bay Brook had attained 99% of its egg deposition conservation level. This estimate is similar to that attained in 2002 and 10% below the average egg deposition 1996-2002. There was a small increase in total returns of small salmon. The total return of large salmon was similar to 2002.

Forecast: There is insufficient information available to forecast the abundance of Atlantic salmon in 2004. However the high egg deposition in 1999 could contribute to an improved returns in 2004.

STOCK: Harry's River (SFA 13) **Drainage area:** 816 km²

CONSERVATION REQUIREMENT: 7.8 million eggs calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1997	1998	1999	2000	2001	2002 [2]	2003	MIN [1]	MAX [1]
Total returns to river									
Small	1747	1659	1713	1271	1028	1640	2334	888	2399
Large	201	191	176	49	132	285	422	16	422
Recreational harvest (small salmon)									
Retained	2	-	-	-	-	-	169	2	319
Released	884	625	702	796	518	400	621	23	1411
Recreational harvest (large salmon)									
Retained	-	-	-	-	-	-		0	0
Released	174	138	47	78	51	75	110	28	220
Spawners									
Small	1657	1596	1643	1191	976	1600	2095	573	2359
Large	184	177	171	41	127	277	405	13	411
Egg conservation requirement									
% met	50	49	49	29	33	60 [3]	82	13	82
Spawners on Pinchgut Brook tributary									
Small	613	593	606	441	200	592	352	200	749
Large	68	63	63	15	3	23	22	3	68

[1] Min and max are for the period of record since 1974.

[2] Preliminary

[3] The percent met in 2002 is at least 60% based on information suggesting that a higher proportion of large salmon spawn below George's Lake than in the tributaries. The percentage met is likely between 60 & 77% if an adjustment could also be made small salmon spawning in the mainstem below George's Lake. There is considerable uncertainty with such and adjustment for small at this time because the dispersion of spawners from the mainstem into the lower tributaries may be later than for Pinchgut Brook.

Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The fishery was limited to catch and release angling from 1996-2002 but the fishery was expanded in 2003 to permit a limited retention fishery in 2003 as part of an overall stewardship program. The retention fishery was restricted to one small salmon retained and the daily hooking and release limit of one per day from 22 July to 7 September.

Data and methodology: Total returns to Harry's River in 2003 were determined from a counting fence operated at the mouth of the river from 11 June to 15 August. Spawning escapements were determined by subtracting estimated angling removals. Estimates of total spawners in 1992-2002 were derived from counts of small and large salmon at a fish counting fence operated on Pinchgut Brook tributary adjusted for the percentage of the total spawning activity observed on Pinchgut Brook tributary during surveys conducted in the fall of 1995-1997. Recreational fishery data for 1994-2002 are from the License Stub Return System; data for 2003 are preliminary. Spawners in 2001-2002 include an adjustment for small and large salmon observed in snorkel surveys of the lower part of the mainstem below George's Lake in mid-August. A hook-and-release mortality of 10% was used in the calculation of total returns and spawning escapements for the years 1993-2003.

State of the stock: The stock has shown some signs of improvement since 1992 with increased juvenile densities and proportion of large salmon but growth has been slow in spite of fisheries management changes. The conservation requirement was not achieved in 2003, but the percent met increased over the previous year. The low water levels experienced in recent years, incidence of poaching and the unknown effects of forest spraying and other human activity in the area create continued uncertainty for the stock.

Forecast: No forecast available.

STOCK: **Lomond River (SFA 14A)** **Drainage area:** 470 km²

CONSERVATION REQUIREMENT: 1.1 million eggs (~ 658 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1998	1999	2000	2001	2002	2003 [3]	MIN [1]	MAX [1]
Total returns to river [2]								
Small	787	1212	1072	572	895	921	259	1529
Large	126	120	90	75	66	82	3	126
Recreational harvest (small salmon)								
Retained	214	359	392	227	363	311	203	650
Released	314	239	220	123	166	212	24	464
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	2	34
Released	21	69	87	33	38	50	2	139
Known removals above fishway								
Small	1	10	3	0	0	0	0	22
Large	1	3	0	0	0	0	0	3
Spawners								
Small	541	819	655	333	515	584	1	983
Large	125	110	81	72	62	77	0	125
Egg conservation requirement								
% met	191	181	140	68	111	129	31	187

[1] Min and max are for the period of record since 1974.
[2] Total returns are approximate because of spawning below the fishway.
[3] Preliminary.
Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The river quota in place since 1986 was dropped in 1999.

Data and methodology: Returns to the river above the fishway are determined from counts at the fishway and recreational catch data below the fishway. With the exception of 1968-1970 and 1989-1991 the fishway has been monitored since 1961. Recreational fishery data for 1994-2003 are from the License Stub Return System; data for 2003 are preliminary. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-2003.

State of the stock: Returns of small salmon in 2003 increased from those in 2002. Returns of large salmon in 2003 were 24% higher than in 2002. The area above the fishway represents about 40% of the total river area. The conservation requirement above the fishway was achieved in 2003. The percent met was 16% higher than in 2002.

Forecast: No forecast available.

STOCK: **Torrent River (SFA 14A)** **Drainage area:** 619 km²

CONSERVATION REQUIREMENT: 1.5 million eggs (~ 656 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 368 eggs/ha

Year	1998	1999	2000	2001	2002	2003 [3]	MIN [1]	MAX [1]
Total returns to river [2]								
Small	5388	4857	4154	2637	4750	3875	96	7475
Large	761	421	596	443	433	341	7	761
Recreational harvest (small salmon)								
Retained	341	720	359	376	755	510	31	755
Released	480	1294	330	449	855	682	75	1294
Recreational harvest (large salmon)								
Retained	-	-	-	-	-	-	1	18
Released	42	224	85	57	117	105	0	224
Spawners								
Small	4999	4008	3762	2216	3909	3297	121	6923
Large	757	399	587	437	421	330	3	757
Egg conservation requirement								
% met	924	680	657	400	597	496	161	1279

[1] Min and max are for the period of record since 1974.
[2] Total returns are approximate because of spawning below the fishway.
[3] Preliminary.
Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information.

Recreational catches: The restriction of hook-and-release angling only until a minimum spawning escapement of 750 salmon had passed through the fishway was dropped in 1999. The area above the fishway was open to catch and release angling in 2002 and 2003.

Data and methodology: Returns to the river above the fishway are determined from counts at the fishway and recreational catch data below the fishway. The fishway has been monitored since 1966. Recreational fishery data for 1994-2003 are from the License Stub Return System; data for 2003 are preliminary. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-2003.

State of the stock: Returns of small salmon in 2003 were 18% lower than in 2002 and returns of large salmon were 21% lower than in 2002. Returns to Torrent River have shown an increasing trend since the late 1970s with the highest returns occurring since 1992. It is estimated that the Torrent River stock has achieved conservation requirement every year since 1978. This is due to the successful enhancement program carried out in 1972-1976 when adult salmon were used to colonize new habitat opened up above the fishway. The conservation requirement was achieved above the fishway in 2003, but was 17% lower than in 2002.

Forecast: No forecast available.

STOCK: **Western Arm Brook (SFA 14A)** **Drainage area:** 149 km²

CONSERVATION REQUIREMENT: 0.91 million eggs (~ 292 small salmon) calculated as fluvial area x 2.4 eggs/m² and lacustrine area x 105 eggs/ha

Year	1998	1999	2000	2001	2002	2003 [3]	MIN [1]	MAX [1]
Total returns to home waters								
Small	1718	1046	1492	563	1465	1406	233	1718
Large	128	22	120	28	48	23	0	128
Recreational harvest (small salmon)[4]								
Retained	-	-	21	24	0	0	0	171
Released	-	-	0	0	0	0	0	52
Recreational harvest (large salmon)								
Retained	-	-	0	0	0	0	0	2
Released	-	-	0	0	0	0	0	2
Known removals above counting fence								
Small	68	1	3	6	2	20	0	223
Large	0	0	0	0	0	2	0	3
Spawners								
Small	1650	1045	1468	533	1463	1386	117	1650
Large	128	22	120	28	48	21	0	128
Egg conservation requirement								
% met	625	370	567	193	510	466	30	625
Smolt count	17139	13500	12706	16013	14999	12086	6232	23845
% Sea survival [2]								
(Adult return year)	7.2	6.1	11.1	4.4	9.1	9.4	2.2	12.1

[1] Min and max are for the period of record since 1974
[2] Sea survival is from smolt to returns as small salmon
[3] Preliminary
[4] Biological sampling by angling
Note: Any changes from previous reports are due to the updating of preliminary data and biological characteristics information

Recreational catches: The river has been closed to angling since 1989. The angling that took place in 2000-2001 from the mouth of the river to 0.5km upstream was part of a biological sampling experiment. The purpose of this experiment was to collect biological information from up to 100 small salmon.

Data and methodology: Counts of smolts and adult salmon were obtained at a fish counting fence located at the mouth of the river in 1971-2003. A hook-and-release mortality of 10% was used in the calculation of spawning escapements for the years 1985-89 when there was a recreational fishery.

State of the stock: Returns of small salmon in 2003 were similar to those in 2002 but returns of large salmon were 52% lower than in 2002. The percentage of the conservation requirement achieved in 2003 was 9% lower than in 2002 but more than twice that in 2001 which was the second lowest year since 1992. The low percentage of conservation requirement achieved in 2001 and 1997 indicates that the status of this stock can fluctuate widely from one year to the next.

Forecast: In spite of continued high egg depositions since the commercial fishery moratorium, smolt production has not increased in recent years. Smolt production in 2003 was 19% lower than in 2002 and only 50% of the maximum production value achieved in 1997. Hence, unless there is an increase in marine survival, returns of small salmon in 2004 are expected to be lower than in 2003. Given the extreme variability in smolt sea survival in recent years, there is considerable uncertainty in this expectation.